

The background of the slide is a grayscale image of a circuit board. It features a complex network of black lines representing traces and several large black circular pads. A dark, semi-transparent horizontal band runs across the middle of the image, serving as a background for the text.

FT8 Image Mode for SSTV

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Summary

- What is FT8?
- Digital SSTV on HF – a Brief History
- EasyPal
- Adapting WSJT-x for SSTV Hybrid Mode

About FT8

- A “digital mode”
- Developed by K1JT and K9AN (Joe Taylor of Princeton, and Steve Franke)
- T/R sequence: 15 seconds
- Bandwidth: 47 Hz
- Modulation 8-FSK, keying rate = tone spacing = 5.86 Hz
- Traditionally used to send callsigns, grid, signal strength

- HOW COULD THIS BE USED TO HANDLE IMAGES?? IMPOSSIBLE! OR IS IT?

Brief History of Digital SSTV

- There have been several software packages that handle digital SSTV.
- A recent one is EasyPal (last release was Oct. 2014, no longer maintained)
 - Originally EasyPal was used to send (usu. jp2) digital image files of up to ~ 27 kb (typical), which took about 2 minutes. The file would be displayed as an image.
 - On noisy 80M, the file rarely transferred cleanly in a single transmission. The receiving program would then send a fix request (“BSR”) request asking for the missed segments. Often, numerous fixes were needed to complete the file sufficiently to display it.
- Enter “Hybrid” mode...

Hybrid Mode

- EasyPal Hybrid mode uses an ftp server as an assist:
- User copies the image or jpg file into EasyPal transmit window
- When ready to transmit, EasyPal copies the image file to an ftp server, then sends the filename digitally over the air
- Receiving station decodes the filename and retrieves the image file from the server via ftp
- This revolutionized digital HF SSTV, because suddenly we were able to send and discuss a lot of pictures in a given evening instead of struggling to transfer just a few of them with various fixes, replays, and relays.
- Yes, it's cheating, but so is DSTAR, DMR, etc., and anything else that mixes wireless and internet modes.

EasyPal - AB4EJ - Ver:07/OCT/2014



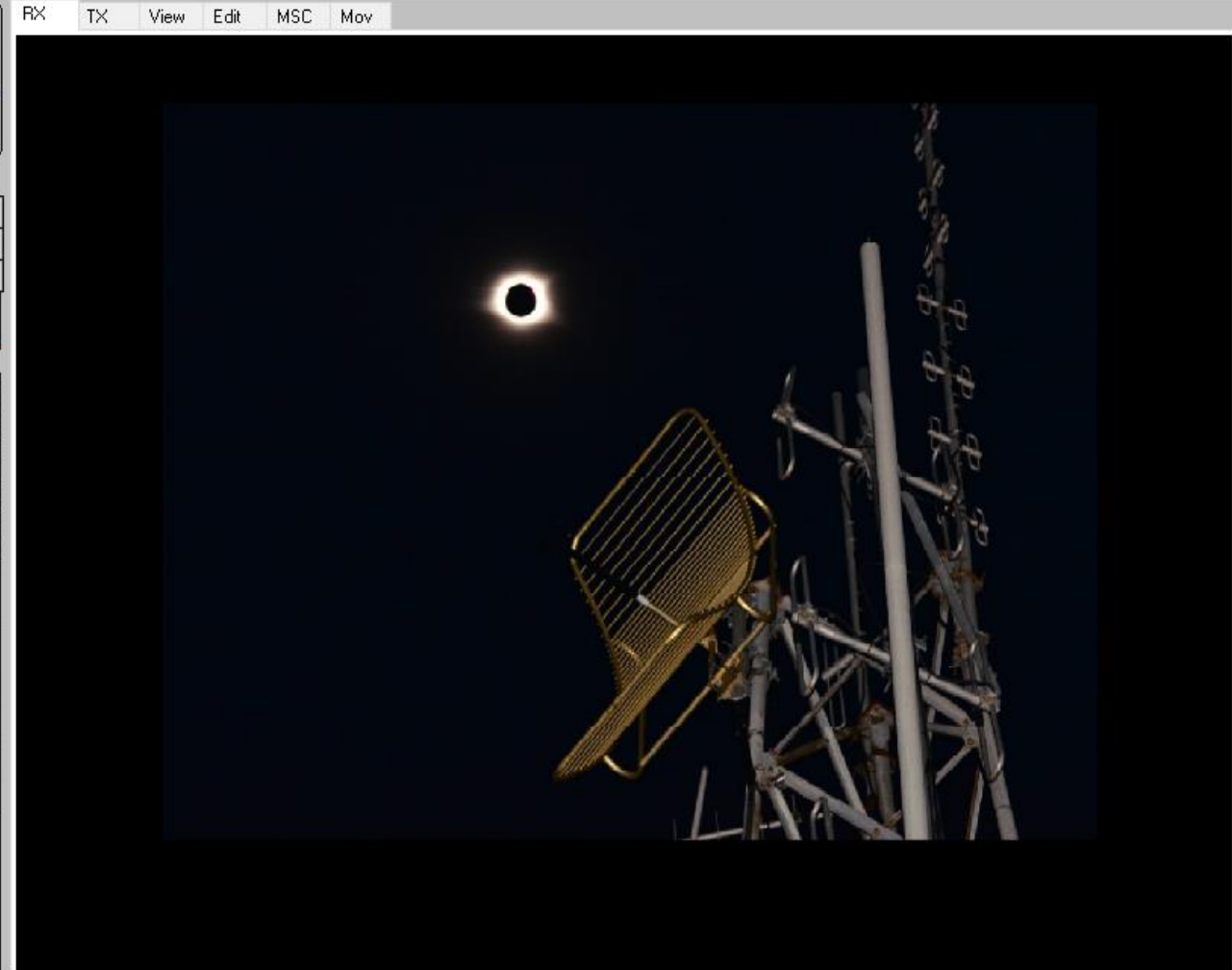
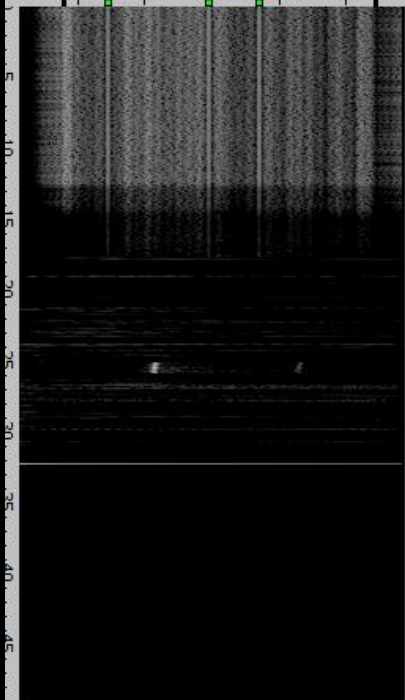
Setup Hybrid Action LoadPic LoadAny Copy Paste WFPic WFTxt Rptr FTP Clear About

AB4EJ

Mode	E	E	TX	RX	Sync
Width	2.4	2.4			MSC
ErrFix	HI	HI			FAC
QAM	4	4			Frame
LeadIn	24	R/N			Time
					IO

Total -
OK Segs -
Position - - remaining segments

TRANSMIT	Replay RX	FIX	BSR	
TUNE	ID	SendText	WAV	Pic/QSL
<input checked="" type="checkbox"/> RS2	M	EmbedText	Station Log	Session



de_AB4EJ-1-Clip.jp2

Gamma < >

However...

- EasyPal hybrid mode still didn't work under difficult band conditions – QRN, poor band condx, etc.
- Wide bandwidth (2800 Hz) highly susceptible to multipath
- Often even the filename would not transfer over EasyPal digital mode
- I thought: I know a mode that can get through *no matter what*: FT8.

WSJT-X

- The entire source code is available as a open source
- Includes the necessary compilers & linkers
- Written in C++ and Fortran
- Uses “Q-T” which results (theoretically) in a code which can be run either on Windows or in Linux
- Challenging: many people are working on this at once

Making WSJT-x handle Images

Added to WSJT-x

- FT8-IMG Mode
- Load Image button
- Configuration to select ftp server
- Windows to display image to be sent, and to display image received
- Disabled the automatic frequency setting function normally used by FT8

New mode
added:
FT8IMG

The screenshot shows the WSJT-X v1.7.1-devel software interface. The 'Mode' menu is open, and 'FT8IMG' is highlighted with a red box. A green arrow points from the text 'New mode added: FT8IMG' to this box. The interface includes a menu bar (File, Configurations, View, Mode, Decode, Save, Tools, Help), a main display area with columns for UTC, dB, DT, Freq, and Message, and a control panel at the bottom. The control panel features buttons for Log QSO, Stop, Monitor, Erase, Decode, Enable Tx, Halt Tx, and Tune. It also displays a frequency of 14.074 000, a DX Call of DL1EL, a DX Grid of JO41, and a date/time of 2018 Feb 07 21:51:16. A 'Generate Std Msgs' section is visible on the right, listing various message templates like 'DL1EL AB4EJ EM63' and 'CQ AB4EJ EM63'. The status bar at the bottom shows 'FT8' and '0/15 WD:6m'.

Config page
to specify ftp
server and
location of
received
picture

The screenshot shows the 'Settings' application window with the 'Advanced' tab selected. The window title is 'Settings'. The tabs are: General, Radio, Audio, Tx Macros, Reporting, Frequencies, Colors, and Advanced. The 'Advanced' tab contains two main sections: 'JT65 decoding parameters' and 'Miscellaneous'. The 'JT65 decoding parameters' section includes a dropdown menu for 'Random erasure patterns' (set to 6), a dropdown for 'Aggressive decoding level' (set to 0), and a checked checkbox for 'Two-pass decoding'. The 'Miscellaneous' section includes dropdowns for 'Degrade S/N of .wav file' (0.0 dB), 'Receiver bandwidth' (2500 Hz), and 'Tx delay' (0.2 s), and an unchecked checkbox for 'x 2 Tone Spacing'. Below these is the 'FT8IMG ftp parameters' section, which includes text input fields for 'Server' (ftp[redacted].com), 'User ID' (anonymous@[redacted].com), 'Password' (empty), 'Path' (incoming), and 'Path to Local Image Storage directory' (c:\pix\).

Settings

General Radio Audio Tx Macros Reporting Frequencies Colors Advanced

JT65 decoding parameters

Select tab to change configuration parameters.

Random erasure patterns: 6

Aggressive decoding level: 0

Two-pass decoding

Miscellaneous

Degrade S/N of .wav file: 0.0 dB

Receiver bandwidth: 2500 Hz

Tx delay: 0.2 s

x 2 Tone Spacing

FT8IMG ftp parameters

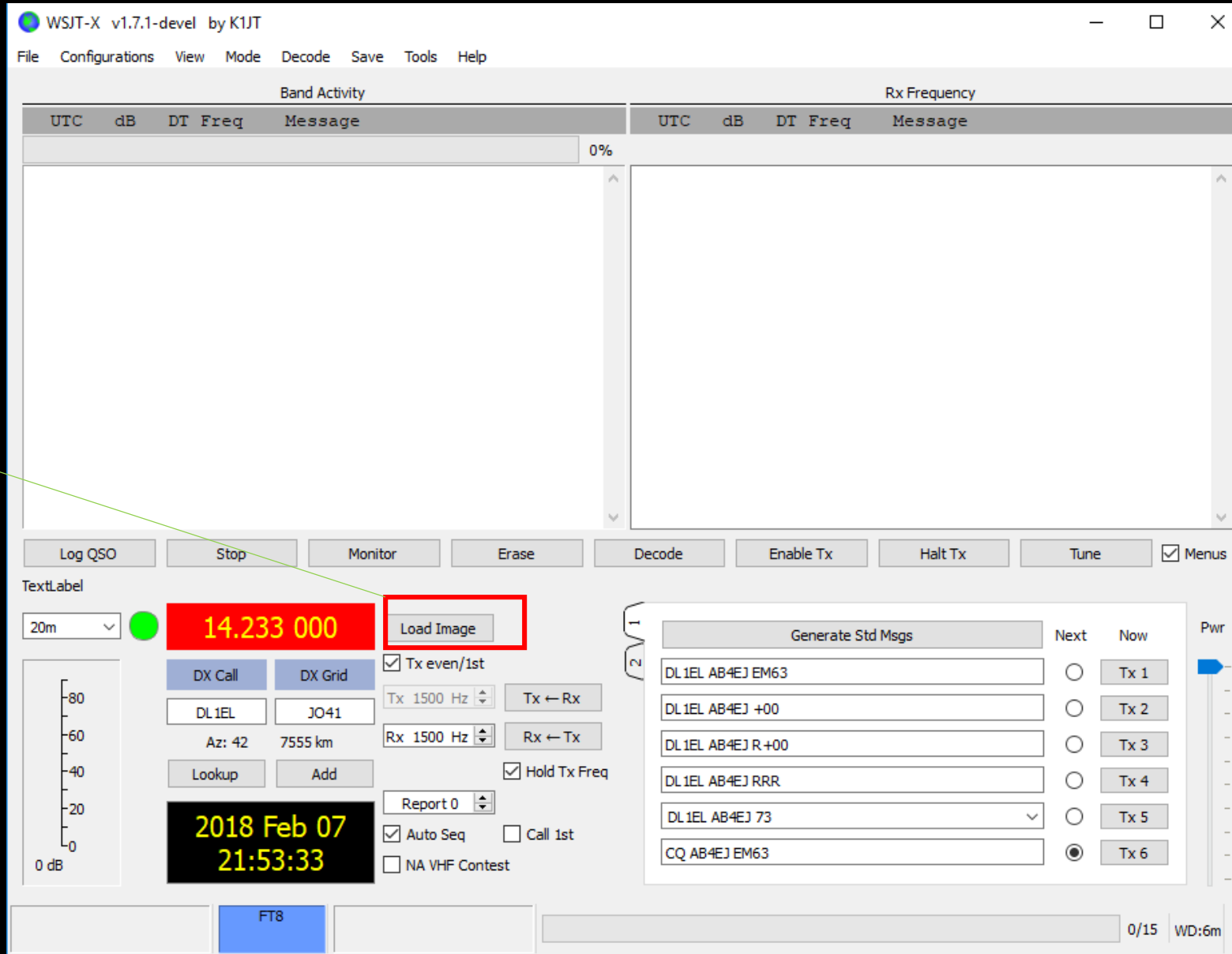
Server: ftp[redacted].com

User ID: anonymous@[redacted].com

Password: [empty]

Path: incoming

Path to Local Image Storage directory: c:\pix\



“Load Image”
Button added

WSJT-X v1.7.1-devel by K1JT

File Configurations View Mode Decode Save Tools Help

Band Activity

UIC	dB	DT Freq	Message
100%			

Rx Frequency

UIC	dB	DT Freq	Message

Log QSO
Stop
Monitor
Erase
Decode
Enable Tx
Halt Tx
Tune
 Menus

TextLabel

20m ●

14.233 000

DL 1EL JO41

Az: 42 7555 km

2018 Feb 07
22:17:53

Receiving

Load Image

Tx even/1st

Tx 1500 Hz Rx ← Rx

Rx 1500 Hz Rx ← Tx

Hold Tx Freq

Report 0

Auto Seq Call 1st

NA VHF Contest

Generate Std Msgs	Next	Now	Pwr
DL 1EL AB4EJ EM63	<input type="radio"/>	Tx 1	<input type="range"/>
DL 1EL AB4EJ +00	<input type="radio"/>	Tx 2	<input type="range"/>
DL 1EL AB4EJ R+00	<input type="radio"/>	Tx 3	<input type="range"/>
DL 1EL AB4EJ RRR	<input type="radio"/>	Tx 4	<input type="range"/>
DL 1EL AB4EJ 73	<input type="radio"/>	Tx 5	<input type="range"/>
CHAMPS.JPG	<input checked="" type="radio"/>	Tx 6	<input type="range"/>

8/15 WD:5m



Received file name

Double click the file name and a second window opens with the picture

The screenshot shows the WSJT-X v1.7.1-devel software interface. The main window is titled "WSJT-X v1.7.1-devel by K1JT" and has a menu bar with "File", "Configurations", "View", "Mode", "Decode", "Save", "Tools", and "Help".

The interface is divided into several sections:

- Band Activity Table:** Located at the top left, it has columns for UTC, dB, DT, Freq, and Message. A row is highlighted in green with a red box around the "Message" column, containing the text "220130 16 -2.2 1500 ~ CHAMPS.JPG".
- Rx Frequency Table:** Located at the top right, it has columns for UTC, dB, DT, Freq, and Message. It is currently empty.
- Control Buttons:** A row of buttons including "Log QSO", "Stop", "Monitor" (highlighted in green), "Erase", "Decode", "Enable Tx", "Halt Tx", "Tune", and "Menus".
- Text Label:** A dropdown menu set to "20m" and a green indicator light.
- Frequency Display:** A large red box displays "14.233 000".
- Call and Grid Information:** Fields for "DX Call" (DL1EL) and "DX Grid" (JO41), along with "Az: 42" and "7555 km".
- Time and Date:** A black box displays "2018 Feb 07 22:02:09".
- Generate Std Msgs:** A table with columns "Next" and "Now" (Tx 1 to Tx 6) and a "Pwr" slider.
- Status Bar:** At the bottom, it shows "Receiving", a blue box with the text "*/incoming* is your current location", and a green progress bar.

CQ SSTV
de AB4EJ



Restrictions & Caveats

- File name length limited to 12 bytes including file extension
- Does not self identify – must give callsign via phone
- PC Clock Synchronization to Naval Observatory is still required
 - Use Dimension4
- But is it legal to use on, say, 14.233 MHz or 3.713 MHz? We think so.
 - Exactly the same as EasyPal Hybrid (on the air for about 5 years) but uses FT8 instead of QAM.
 - Image mode only - Cannot be used to transfer arbitrary data
 - Even if judged to be “data” could still be used on 60 meters, where voice and data coexist.
- Still in Beta Test (not integrated with other WSJT-x development); still a little buggy